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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHODS OF DIAGNOSIS OF PROSTATE CANCER, COMPOSITIONS AND METHODS OF SCREENING FOR MODULATORS OF PROSTATE CANCER

(57) Abstract: Described herein are genes whose expression are up-regulated or down-regulated in prostate cancer. Also described are such genes whose expression is further up-regulated or down-regulated in drug-resistant prostate cancer cells. Related methods and compositions that can be used for diagnosis and treatment of prostate cancer are disclosed. Also described herein are methods that can be used to identify modulators of prostate cancer.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/32045

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12Q 1/68; C07H 21/02; C12N 15/85
US CL : 435/6; 536/23.1; 435/325

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 435/6; 536/23.1; 435/325

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MPSRCH sequence similarity search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	WO 01/60860 A2, (MILLENNIUM PREDICTIVE MEDICINE, INC.), 23 August 2001, see entire document, especially SEQ ID NO:297.	1-15,56-67 — 55
X — Y	WO 01/55447 A1 (HUMAN GENOME SCIENCES, INC.) 02 August 2001, see entire document.	1-15, 56-67 — 55

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	WO 01/55447 A1, (HUMAN GENOME SCIENCES, INC.), 02 August 2001. See entire document.	1-15, 56-67 — 55

INTERNATIONAL SEARCH REPORT

International application No.
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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ ~~As only some of the required additional search fees were timely paid by the applicant, this international search report~~ covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-15, 22-26, 55-67, SEQ ID NO:241

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

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BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

It is noted that claim 70 is not searchable, and thus not included in the following lack of unity, because the language "said determining" of claim 70 lacks antecedent basis, which is not found in claim 59 to which claim 70 depends, and thus it is not clear what determining is referred to.

Groups 1, claim(s) 1-15, 22-26, 55-67, drawn to a single polynucleotide sequence shown in tables 1-16, a vector and a host cell, and a method of detecting a prostate cancer transcript, or a prostate cancer, or monitoring the efficacy of a prostate treatment, comprising selectively hybridizing with a sequence at least 80% identical to said nucleotide sequence.

Groups 2-8990, claim(s) 1-15, 55-67, drawn to a method of detecting a prostate cancer transcript, or a prostate cancer, or monitoring the efficacy of a prostate treatment, comprising selectively hybridizing with a sequence at least 80% identical to one of 8989 nucleotide sequences shown in tables 1-16. A method detecting each of 8989 nucleotide sequences constitutes a single invention.

Groups 8991-17980, claim(s)16-18, 37, drawn to a method of monitoring the efficacy of a prostate treatment, comprising determining the level of an antibody specific for one of the polypeptide encoded by a polynucleotide that selectively hybridizing with a sequence at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A method detecting each antibody specific for each polypeptide sequence constitutes a single invention.

Groups 17981-26970, claim(s) 19-21, 34-36, drawn to a method of monitoring the efficacy of a prostate treatment, or detecting prostate cancer, comprising determining the level of a polypeptide encoded by a polynucleotide that selectively hybridizing with a sequence at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A method detecting each polypeptide sequence constitutes a single invention.

Groups 26971-35960, claims 22-26, drawn to a polynucleotide sequence shown in tables 1-16, a vector and a host cell. Each polynucleotide from 8989 nucleotides of tables 1-16 constitutes a single invention.

Groups 35961-44950, claim 27, drawn to a polypeptide encoded by a polynucleotide sequence shown in tables 1-16. Each polypeptide encoded by a polynucleotide from 8990 nucleotides of tables 1-16 constitutes a single invention.

Groups 44951-53940, claims 28-33, drawn to an antibody that specifically binds to a polypeptide encoded by a polynucleotide sequence shown in tables 1-16. Each antibody specific for a polypeptide encoded by a polynucleotide from 8990 nucleotides of tables 1-16 constitutes a single invention.

Groups 53941-62930, claims 38-43, drawn to a method for identifying compounds that modulate a prostate cancer associated polypeptide, encoded by a polynucleotide that selectively hybridizing with a sequence at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A method that identify compounds that modulate each polypeptide sequence constitutes a single invention.

Groups 62931-71920, claims 44-46, drawn to a method for treating prostate cancer, comprising administering a compound that modulates a prostate cancer associated polypeptide, encoded by a polynucleotide that selectively hybridizing with a sequence at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A method using compounds that modulate each polypeptide sequence constitutes a single invention.

Groups 71921-80910, claims 47-49, 69, drawn to a method for identifying compounds that modulate the level of expression of a polynucleotide that selectively hybridizing with a sequence at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A method that identify compounds that modulate each polynucleotide sequence constitutes a single invention.

Groups 80911-89900, claims 50, drawn to a method for treating prostate cancer, comprising administering a compound that modulates the level of expression of a polynucleotide that selectively hybridizing with a sequence at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A method using compounds that modulate each polynucleotide sequence constitutes a single invention.

Groups 89901-98890, claim 51, drawn to a compound that modulates the level of expression of a polynucleotide that selectively hybridizing with a sequence at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A compound that modulates each polynucleotide sequence constitutes a single invention.

Groups 98891-107880, claims 52-54, drawn to a method of detecting prostate cancer transcript, comprising selectively hybridizing with a plurality of sequences at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A method detecting each combination from 8990 nucleotide sequences constitutes a single invention.

Groups 107881-116870, claim 68, drawn to a biochip comprising a plurality of sequences at least 80% identical to one of 8990 nucleotide sequences shown in tables 1-16. A biochip comprising each combination from 8990 nucleotide sequences constitutes a single invention.

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The inventions listed as Groups 1-116870 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

An international stage application shall relate to one invention only or to a group of invention so linked as to form a single general inventive concept. If multiple products, processes of manufacture or uses are claimed, the first invention of the category first mentioned in the claims of the application will be considered as the main invention in the claims, see PCT article 17(3) (a) and 1.476 (c), 37 C.F.R. 1.475(d). Group I will be the main invention. After that, all other products and methods will be broken out as separate groups (see 37 CFR 1.475 (d)).

Group 1, claims 1-15, 22-26, 55-67, drawn to a single polynucleotide from tables 1-16, and a method for detecting said single polynucleotide form a single inventive concept.

Groups 2-26,970, 53941-89900 and 98891-107880 are additional methods which are different from the method of group 1 in methods objectives, and reagents used.

Groups 26971-53940, 8901-98890 and 107881-116870 are additional products which are different from the product in group 1, because they have different structure and biological activity.